

PILODIST®

laboratory & process technology

***Fully Automatic Crude Oil Distillation System
with fraction collector
PETRODIST 350 CC
(ASTM D1160 and D5236)
New version 2020***

PETRODIST® 350 CC

www.pilodist.de

Tel: ++ 49 (0) 2225 955910

Fax: ++ 49 (0) 2225 9559111

e-mail : *info@pilodist.de*

**PILODIST GmbH
Eichelnkampstraße 2
D-53340 Meckenheim**

**Eingetragen AG Bonn HRB 12941
Sitz: Bonn
Managing Director K. Jürgen Fischer
USt.-ID.-Nr. DE 813 408 398**

**Bankers:
Sparkasse KölnBonn
IBAN DE 05 3705 0198 0033 3023 65 BIC: COLSDE33XXX
Deutsche Bank AG
IBAN DE 46 3707 0060 0333 2673 00 BIC: DEUTDEDKXXX**



PETRODIST® 350 CC

Fully automatic crude oil distillation system, processor controlled according to ASTM D-1160 but with automatic fraction collector for the determination of boiling ranges of crude oil

products under vacuum. The system can be operated in strict accordance to the ASTM D1160 procedure or alternatively, by using the automatic fraction collector with 5 receivers. The system also provides possibility to work similar to ASTM D5236 and can be optionally equipped with flask sizes of 1000 ml or 2000 ml.

By adding option 1 the system will be also able to do atmospheric distillations of light samples like diesel, biodiesel and charges with water content.

Special advantages of the new **PETRODIST® 350 CC**

- parameter input, display as well as calculation of distillation and final data and print out of the distillation curve
- PILODIST IP65 control panel with 15,6" touch screen mounted at the side of framework or alternatively stand alone as tabletop unit
- distillation process can be set on pause to remove the receiver with Bromine Number cut and can be continued with new receiver and the same sample immediately
- easy operation due to userfriendly software
- sophisticated safety system
- individual distillation reports and curves can be re-called any time
- precise distillation data due to automatic calculation of the density data based on the receiver temperature
- anti-foaming by dynamic vacuum reduction during evacuation phase
- precise vacuum control by automatic throttle valve
- automatic washing run
- calculation of charge according to receiver temperature and charge density
- quick set up effort as the system is delivered pre-installed
- automatic controlled termination of distillation process and start of cooling
- automatic fraction collector with 5 receivers independent of operation pressure
- new PILODIST-brand fully automatic continuously working discharge (gear) pump
- dynamic vacuum reduction procedure analogue ASTM D-5236 (Potstill) is possible
- atmospheric distillation
- water removal (dehydration) process prior to distillation(**by adding option 1**)
- cutting according to temperature or volume also in different pressure stages

The PILODIST fully automatic ASTM-D1160 systems PETRODIST 300 CC and PETRODIST 350CC are delivered with a double pressure sensor system in standard configuration without additional charge. A high accuracy and high resolution sensor covers the vacuum ranges according to the standard from 0,1 Torr (mmHg) up to 50 Torr (mmHg). To extent the functionality and flexibility of the instrument a second high precision sensor covers the atmospheric pressure for an automatic ambient air pressure correction and for

vacuum distillations at all pressure levels from ATM down to 0,1 Torr (mmHg) without limitations. This allows to earn high reliable data of atmospheric distillations independent of the laboratory location and the possibility to handle samples with wide boiling point ranges. For example whole crudes can be distilled fully automatic through different pressure levels to achieve a complete distillation report and yield-temperature-curves. This can be used for quick analyses of crudes and to characterize feedstocks.

The distillation runs automatically from the initial boiling point to the pre-selected end boiling point or detected break-off. The criteria for break-off are:

- the pre-selected final AET (atmospheric equivalent temperature) is reached
- the maximum flask temperature is reached
- the pre-selected distillate volume is reached
- the flask insert cracks
- the distillate pressure drops

The distillation volume is measured automatically in receivers, temperature controlled by IR-heater. The yield is calculated in percentage to the charge quantity. Distillation report, final data and distillation curve are printed out and stored tamper-proof as pdf file.

A safety enclosure of the system to adequately shield the operator from the distillation apparatus in case of mishap as suggested by ASTM D1160-15 is quoted as an option as some customers will use the system within a fume hood.

Technical Data

Flask size 1:	500 ml
Flask size optionally:	1000 ml, 2000 ml (see option 9 and 10)
Max. flask temperature:	400° C (750° F)
Operation pressure:	ATM, 95 Torr down to < 1 Torr (abs.)
Fraction collector:	5 calibrated receivers, 200 ml each
Power consumption:	3500 W
Mains supply:	208-250 V, 50 Hz (standard) 208-250 V, 60 Hz (optional)
Dimensions (w x h x d):	0,65 x 2,02 x 0,75 m

The system consists of:

- 1 mobile system basis (mounting frame) for the assembly of all parts, equipped with all system specific electric, mechanic and pneumatic control, mounted on rolls
- 1 distillation flask, 500 ml, made of glass, with nozzle for temperature sensor
- 1 flask temperature sensor PT-100 for 500 ml-flask
- 1 magnetic stirrer bars for intensive mixing of the flask content
- 1 high-temperature electrical heating bath with insulating mantle for 500 ml flask with temperature sensor PT-100 and integrated stirrer drive, with lifting platform, heated insulation jacket for the upper half of the flask.
- 1 distillation head (internal diameter 25 mm) with silvered vacuum jacket, with integrated product cooler, condenser, the dimensions of the distillation head corresponds to the ASTM-method
- 1 head temperature sensor PT-100 according to the ASTM-method
- 1 volume measuring device for the automatic control of the distillation rate with light barrier equipped,
- 1 light barrier for IBP detection
- 1 hermetically blocked gear pump for continuous product discharge
- 1 fraction collector chamber, heatable up to 70 °C with temperature sensor
- 1 atmospheric automatic fraction collector with 5 calibrated receivers, 200 ml each
- 1 wide range vacuum sensor, independent of the type of gas, measuring range 1000 Torr absolute pressure
- 1 vacuum sensor, independent of the type of gas, with inconel diaphragm, measuring range 100 Torr absolute pressure (other ranges upon request)
- 1 analog manometer from -1 ... + 0,6 bar for display of actual system pressure status
- 1 vacuum cold trap for protection of the vacuum pump
- 1 solenoid valve for vacuum stabilisation with automatic throttle valve
- 1 vacuum pump, 8 m³/h, 2 stages
- 1 circulating heating thermostat, 3 l, temperature range +20...+150°C, working range +20°C (ambient temperature)... +90°C
- 1 distillation control & data evaluation station 350 CC with PILODIST IP65 control panel with 15,6" touch screen and printer for input of all distillation parameters and for display of pre-selected, calculated and actual operation values, with continuous communication to processor, supervising data station. Calculation of the distillation results as well as printout of yield and distillation curve. Parameters can be stored as recipes and can be reloaded. Results and distillation curves including oil specific data and laboratory code are stored as pdf files and can easily be transferred via network to other users.

Order no.: 350CC-000-00

Options:

Option 1

For application of atmospheric or biodiesel distillation as well as dehydration process prior to distillation a cooling thermostat is required

Circulating thermostat, operating range -20°C... + 150°C,
(instead of +20°C...+150°C as included in standard scope of supply)

Order-No: 30011-OP1-00

Option 2

Automatic fire extinguisher

Automatic fire fighting system with a steel cylinder with 10 kg volume of CO₂. UV-sensors for monitoring the system control electronics and pneumatic valve. In case of fire the complete distillation system will be shut-down and the system will be inflated by CO₂.

According to safety regulations for transportation the fire extinguisher system will be shipped emptied (without CO₂) and the steel cylinder needs to be filled at customer's site with CO₂. It is recommended to the end-user to arrange an annual maintenance of the fire extinguisher system by an authorized local company.

The effectivity of the fire extinguishing system needs either a complete sheathing of the system as offered above or it needs to be placed in an on-site available fume hood!

By reason of different mounting space and conditions Pilodist declares as follows:
The customer is responsible for the overall concept including risk assessment as well as the determination of all measures regarding the protection of persons.
The customer is also responsible to consider national laws and the valid rules for the location, especially for installation, acceptance, testing and maintenance for the fire extinguisher system.

Regarding to German prescriptions it has to be ensured, that the CO₂ concentration must not exceed 5% of the breathable air and the O₂ concentration must not fall below 15%. Roughly estimated this value is 10 m³ of free volume for each kg of CO₂, in which the height of the room must be taken with max. 2m. All quantities of extinguishing media, that can react together in the same room, are to add.

Pilodist is not responsible for any injury, illness, death, damage, expense, cost or other sum or claim of any description caused by the fire extinguisher system.

Order-No.: AFIEX-001-00

Option 3

ASTM D1160 reference fuel (n-Hexadecane), bottle of 500 mL

Order-No: RFUEL-116-00

Option 4

Accessories for testing & calibration of the vacuum sensor

Special test kit to connect an additional reference vacuum sensor with digital display to the PETRODIST system for testing and calibration the system vacuum sensor zero point.

The test kit consists of:

- 1 reference vacuum sensor with digital display
- 1 special sensor cable
- 1 adapter piece with sealings and clamps

Order-No: TESTK-VAC-03

Option 5

Sheathing in polycarbonate

Side covers (left and right) and splitted front cover with doors in polycarbonate

Order-No.: 350CC-8PS-99

Option 6

Immersion Cooler for cold trap

Immersion cooler for the automatic operation of the vacuum cold trap instead of dry ice or liquid nitrogen. Closed process system for constant temperature in the cold trap of approx. – 40°C.

Order-No.: ICOOL-JFT-20

Option 7

Additional 1000 ml flask

including distillation flask, flask heater, insulation hood for upper half of the flask and stainless steel temperature sensor

Order-No.: 30011-FLH-01

Option 8

Additional 2000 ml flask

including distillation flask, flask heater, insulation heater for upper half of the flask and stainless steel temperature sensor

Order-No.: 30011-FLH-02

Option 9

For operation of the system without immersion cooler with a power supply frequency of 60Hz instead of 50Hz.

With this option the PD300 M will be equipped for **208-250V 60Hz** use (instead of 208-250V 50Hz)

Order-No: 300M0-OP3-00

Option 10

For operation with immersion cooler with a power supply frequency of 60 Hz instead of 50 Hz.

With this option the PD300CC will be equipped for **208-250V 60Hz** use (instead of 208-250V 50Hz).

Order-No: 30011-OP3-00

Option 11

Hydrogen Sulphide Alarm

Monitoring of hydrogen sulphide escaping from the system. Sensor for detection of hydrogen sulphide with digital display of concentration from 1 to 20 ppm. When the alarm is ignored, the distillation will be switched off after a preselected time.

Order-No.: HSUAL-001-00

Consumables

Recommended for 2 years' operation for PETRODIST 350 CC

pcs.	item	part number
1	magnetic stirrer bar 50 x 20 mm	STBAR-250-10
10	VITON O-rings 28 x 4 mm	ORING-284-01
10	VITON O-rings 18 x 4 mm	ORING-184-00
10	VITON O-Rings 11x 3 mm	ORING-113-00
10	PTFE-silicone sealing 12 x 6 mm	GASKT-126-01
2	PTFE-silicone sealing 22 x 12 mm	GASKT-220-01
2	litres vacuum pump oil	VPUMP-900-00

Spare parts

pcs.	item	part number
1	cold trap, glass, incl. condensate trap	30011-500-01
1	distillation flask, 500 ml, made of glass	30011-200-00
5	final receiver 200 ml	300CC-400-01
5	receiver dripping plates	300CC-410-00
1	vacuum connection piece	30011-710-00
1	condensate trap 10 ml graduated	30011-510-10
1	head temperature sensor PT-100	30011-150-01
1	light barrier for first drop	300CC-LB1-01
1	light barrier for volume detection	300CF-LB2-01
2	double contact relay 24V	RELDC-024-00
2	solid state relay	RELSS-240-00
1	m PTFE (Teflon) vacuum tubing	VHOSE-021-01
1	check valve G 3/8" - 12 mm	RVENT-RVH-12
1	set of clamps	CLAMP-350-CC

Spare parts for optional equipment

pcs.	item	part number
1	distillation flask, 1000 ml, made of glass	30011-210-00
1	distillation flask, 2000 ml, made of glass	30011-220-01